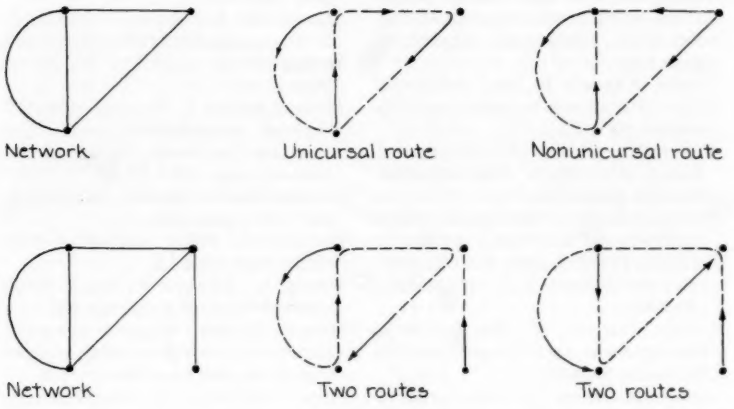
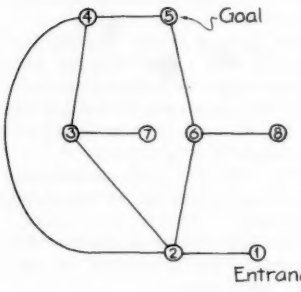


Routes that fully explore networks



M	1	2	3	4	5	6	7	8
1	0	1	0	0	0	0	0	0
2	1	0	1	1	0	1	0	0
3	0	1	0	1	0	0	1	0
4	0	1	1	0	1	0	0	0
5	0	0	0	1	0	1	0	0
6	0	1	0	0	1	0	0	1
7	0	0	1	0	0	0	0	0
8	0	0	0	0	0	1	0	0

M^2	1	2	3	4	5	6	7	8
1	1	0	1	1	0	1	0	0
2	0	4	1	1	2	0	1	1
3	1	1	3	1	1	1	0	0
4	1	1	1	3	0	2	1	0
5	0	2	1	0	2	0	0	1
6	1	0	1	2	0	3	0	0
7	0	1	0	1	0	0	1	0
8	0	1	0	0	1	0	0	1

M^3	1	2	3	4	5	6	7	8
1	0	4	1	1	2	0	1	1
2	4	2	6	7	1	7	1	0
3	1	6	2	5	2	2	3	1
4	1	7	5	2	5	1	1	2
5	2	1	2	5	0	5	1	0
6	0	7	2	1	5	0	1	3
7	1	1	3	1	1	1	0	0
8	1	0	1	2	0	3	0	0

A matrix representing a maze network

are numbered and the number of connections between successive nodes is listed in a matrix. The power of the matrix is raised until a number appears in the element corresponding to a link between the entrance node and the goal node. The power of the matrix is the number of branches in the minimal route for the maze. The matrix does not reveal where direct routes are, but it can indicate whether a direct route you may already have found is the minimal route.

If a maze has one-way branches, its matrix is modified. For example, if you can move from node 4 to node 3 but not in the other direction, the element 4–3 is 1 but the element 3–4 is 0. If you enjoy the matrix approach to a maze, you might like to see whether the minimal route in "Alphabet Soup" consists of 10 nodes as I asserted and whether there is only one such route. A copy of a paperbound book, *A Celebration of Mazes,* is available from Minotaur Designs for £3 in the U.K. and Europe (42 Brampton Road, St. Albans, Hertfordshire AL1 4PT, U.K.) or for $9 in North America (247 Montgomery Steet, Jersey City, N.J. 07302). Readers in other regions should inquire at the U.K. address.

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